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# Armed Services Technical Information Agency

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PROGRESS REPORT NO 26

L-BAND

TRAVELING-WAVE TUBES

Index No NE-111613 Subtask 15

Contract No Obs-57413

July 1954

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WASHINGTON 25, D.C.

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PROGRESS REPORT NO. 26

L-BAND TRAVELING-WAVE TUBES

During the month of July, 1954, development work on the type X-244 traveling-wave tube continued.

Tubes Nos. 8 and 9 were checked for cathode emission and were found to be in good condition.

Attenuation measurements were made on the helix wound with Inconel-x wire; the attenuation was 3 db at 900 mc, and increased to 5.5 db at 1200 mc. The values are in the same order as those obtainable with the iron-plated helix, and provide an alternative means of obtaining series attenuation.

Attenuators in the form of quartz and ceramic surfaces with aquadag coatings have been prepared and measured. Using aquadag-coated ceramic bars of rectangular shape in contact with the helix, and extending radially through slots in the surrounding shell, it is possible to obtain attenuation values of 4 db per inch of axial length.

It is proposed to metalize these bars at their outermost portions so that thermal contact may be affected between the bars and the shell. In this manner the heat generated at the attenuator may pass radially into the shell where it may be removed by liquid cooling. The present work is being done with magnesium-silicate bars which were on hand; an order will be placed for alumina bars which have superior thermal and electrical characteristics.

A model of the cathode from the electron gun was sealed into a bulb for the purpose of making temperature measurements. This structure has been running at rated heater power for 900 hours.

In spite of the high beam transmission reported for Tube No. 9, the power intercepted by the anode has produced overheating and gas evolution. For this

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reason, and until the intercepted power has been reduced to a fraction of one per cent, the anode will be liquid cooled.

The erratic behavior of the modulator has been traced to a defective charging choke. This choke will be replaced by the manufacturer of the equipment. Since this is the second instance of choke failure, the manufacturer has promised to undertake measures to insure that no further difficulty may be anticipated.

During the next month a tube will be built using the ceramic-bar attenuator, and further work will be done on the attenuation problem.

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